Listing of Claims

The following listing of claims will replace all prior versions, and listings, of claims in the subject application:

1. (currently amended) A digital imaging device comprising:

a top electrode layer;

a dielectric layer under the top electrode layer;

a sensor layer under the dielectric layer, comprising a photoconductive layer and a plurality of pixels, each pixel comprising a charge-collecting electrode;

a thin film transistor readout matrix connected to the charge-collecting electrodes; and

a variable power supply set ~~adapted~~ to provide ~~a range of~~ voltages between the top electrode layer and the readout matrix of 3.0 kV to 1.5 kV, said voltages [[;

said range of voltages]] establishing electrical fields in said sensor layer ~~ranging from~~ between a minimum electrical field E_C, at which a signal-to-noise ratio of the device is relatively high but the device operates below a saturation point, ~~to~~ and a higher electrical field E, at which the signal-to-noise ratio may be lower but is at least 50; and

said variable power supply being set to a selected voltage ~~within said range~~ between 3.0 kV and 1.5 kV matching a selected object being imaged with said digital imaging device.

2. (original) The digital x-ray imaging device of claim 1 wherein the variable power supply comprises a programmable power supply.

3. (original) The digital x-ray imaging device of claim 1 wherein the photoconductive layer comprises an element selected from the group consisting of: selenium, lead iodide, thallium bromide, indium iodide, and cadmium telluride.

4. (original) The digital x-ray imaging device of claim 3 wherein the photoconductive layer is about 100 to about 1000 microns thick.

5. (original) The digital x-ray imaging device of claim 4 wherein the photoconductive layer comprises a layer of selenium about 500 microns thick.

Claims 6-8 (canceled).

9. (currently amended) A method for providing a broad dynamic range for a digital imaging device and controlling a signal-to-noise behavior of the device to maintain a signal-to-noise ratio of at least ~~a selected level~~ 50 and prevent saturation of the device, said device comprising a top electrode layer; a dielectric layer; a sensor layer comprising a photoconductive layer and a plurality of pixels, each pixel comprising a charge-collecting electrode; a thin film transistor readout matrix connected to the charge-collecting electrodes; and a power supply for supplying a voltage between the top electrode layer and the readout matrix; the method comprising varying the voltage between the top electrode and the readout matrix between 3.0 kV and 1.5 kV to provide ~~an acceptable~~ signal-to-noise ratio of at least 50 over

a ~~greater~~ range of exposures ~~than provided with a single voltage~~; said step of varying said voltage comprising varying the voltage to ~~establishing~~ establish electrical fields in said sensor between ~~ranging from~~ a minimum electrical field E_C, at which the device has a relatively high signal-to-noise ratio but still remains below a saturation point, ~~to~~ and a higher electrical field E, at which the device has a signal-to-noise ratio that may be lower but still is at least 50, and said varying further comprising ultimately setting said voltage at a level within said range matching an object being examined with said device.

10. (original) The method of claim 9 further comprising using the method for non-destructive testing of one or more objects.

11. (original) The method of claim 10 further comprising performing the non-destructive testing on an object selected from the group consisting of: a printed circuit board, a wax casting, a metal casting, a turbine blade, and a rocket cone.

12. (original) The method of claim 9 comprising varying the voltage in a range between about 1.5 kV and about 3.0 kV.

13. (original) The method of claim 9 comprising using the digital imaging x-ray device with a range of x-ray energies from about 10 KeV to about 10 MeV.

Claim 14 (canceled).

15. (currently amended) A method of operating a digital imaging device to image an object in a non-destructive testing process, said digital imaging device comprising a top electrode layer, a sensor layer comprising a photoconductive layer and a plurality of pixels, each pixel comprising a charge-collecting electrode, a thin film transistor readout matrix connected to the charge-collecting electrodes, and a power supply for supplying a voltage between the top electrode layer and the readout matrix; the method comprising the steps of selectively varying the voltage between the top electrode and the readout matrix to provide a signal-to-noise ratio of at least 50 over a range of exposures and to select a voltage within said range that establishes an ~~electric~~ electrical field in said sensor layer of at least a minimum value E_C and causes the digital imaging device to operate below a digital electronic saturation point, said selected voltage corresponding to a selected signal-to-noise behavior in which the signal-to-noise ratio is at least 50 and matches a selected object being imaged with said device in said non-destructive testing process.

16. (previously presented) A method as in claim 15 in which said voltage is in the range of 1.5 kV and 3.0 kV.

17. (previously presented) A method as in claim 16 in which the signal-to-noise ratio increases from below 200 to above 300 before said saturation point is reached as said voltage changes from 3.0 kV to 1.5 kV.

18. (previously presented) A method as in claim 15 in which said selected voltage causes said minimum electrical field to

corresponds to a signal-to-noise ratio in excess of 300.

19. (previously presented) A method as in claim 15 in which said selected signal-to-noise behavior is maintained at exposures in the range of 10KeV to 10 MeV.

20. (previously presented) A method as in claim 15 including the step of presetting a number of selected voltages for use with respective types of specimen.

Amendment to the Drawings

The drawings were objected to under 37 C.F.R. §1.84(h)(5).

Applicants propose amending Fig. 1 to remove element 60 (Replacement Sheet 1) and adding Fig. 7 to show element 60 (Replacement Sheet 6), as illustrated in Exhibit A attached hereto, and request the Examiner's approval thereof.

REMARKS

The application has been reviewed in light of the final Office Action dated January 22, 2003. Claims 1-7, 9-13 and 15-20 were pending in this application. By the present Amendment, claims 6 and 7 have been canceled, without prejudice or disclaimer, and claims 1, 9, and 15 have been amended to place the claims in better form for examination. Claims 8 and 14 were previously canceled without prejudice or disclaimer. Therefore, claims 1-5, 9-13 and 15-20, with claims 1, 9 and 15 being in independent form, are now presented for examination in this application.

Claims 1-3, 6, 9, 10, 12, 15-18 and 20 were rejected under 35 U.S.C. 103(a) as purportedly unpatentable over U.S. Patent No. 6,323,490 to Ikeda et al. in view of U.S. Patent No. 6,163,029 to Yamada et al. Dependent claims 4, 5 and 7 were rejected under 35 U.S.C. 103(a) as purportedly unpatentable over Ikeda and Yamada in view of U.S. Patent No. 6,330,303 to Yamane et al. Dependent claims 11, 13, and 19 were rejected under 35 U.S.C. 103(a) as purportedly unpatentable over Ikeda and Yamada in view of U.S. Patent No. 5,379,336 to Kramer et al.

Applicants have carefully considered the Examiner's comments and the cited art, and respectfully submit that independent claims 1, 9 and 15, as amended, are patentable over the cited art, for at least the following reasons.

Applicants have amended claim 1 to clarify that the variable power supply is set to 3.0 to 1.5 kV, said setting keeping the imaging device both below saturation and at a signal-to-noise ratio of at least 50. Thus, the pertinent parameters are recited as properties of the variable power supply and the panel rather than as a desired function

in the operation of the panel.

Applicants do not find a teaching or suggestion in the applied prior art of an imaging device with the recited variable power supply. As the Office Action acknowledges, *Ikeda* does not specifically identify the criteria used to determine the selected voltage. *Yamada*, like Ikeda, fails to disclose or suggest an imaging device with such a power supply. The portion of *Yamada* referred to in the Office Action, column 9, lines 9-18, does not disclose either voltage levels or a signal-to-noise ratio level. As the Office Action points out, *Yamada* refers in Fig. 3 to using 1 kV to 1.7 kV in the prior art, but does not teach or suggest a power supply set to keep a signal-to-noise ratio at least at 50 while keeping the imaging device below saturation.

Accordingly, Applicants respectfully submit that an imaging device with a power supply that (1) supplies the numerical voltage range specified in the amended claims, (2) maintains the imaging device below saturation, and (3) keeps the signal-to-noise ratio at least at 50, is not taught or suggested by the applied references, but is a significant improvement in the relevant technology.

Applicant also have amended method claim 9 to clarify that the claimed method maintains a signal-to-noise ratio of at least 50 while supplying 3.0 kV to 1.5 kV between the top electrode layer and the readout matrix and maintaining the imaging device below saturation. No method with those specific parameters is taught in the applied references. Even if relevant parameters of the applied references could be adjusted to carry out the method of amended claim 9 (and this is not admitted), this is not sufficient to make claim 9 obvious because the references do not suggest doing so, and the unspecified

values of the relevant parameters could be adjusted to a virtually unlimited number of combinations of voltage levels, saturation levels and signal-to-noise ratio levels.

Applicants respectfully traverse the suggestion that the structure of Fig. 3 in *Ikeda* is substantially identical to that disclosed in this application. In connection with this Figure, *Ikeda* refers at column 2, lines 31-32 to a 1995 publication by a co-worker of the inventors here. The two devices are not identical. The 2001 *Ikeda* patent application describes and claims an improvement over the 1995 device.

The remaining independent claim, 15, also is a method claim and recites the combination of (1) providing a signal-to-noise ratio of at least 50, (2) operating below saturation, and (3) varying the voltage to achieve these parameters. As earlier discussed, the applied prior art does not teach or suggest such a method.

Accordingly, for at least the above-stated reasons, Applicants respectfully submit that independent claims 1, 9 and 15, and the claims depending therefrom, are patentable over the cited art.

The Office is hereby authorized to charge any additional fees that may be required in connection with this amendment and to credit any overpayment to our Deposit Account No. 03-3125.

If a petition for an additional extension of time is required to make this response timely, this paper should be considered to be such petition, and the Commissioner is authorized to charge the requisite fees to our Deposit Account No. 03-3125.

If a telephone interview could advance the prosecution of this application, the Examiner is respectfully requested to call the undersigned attorney.

Entry of this amendment and allowance of this application are respectfully requested.

Respectfully submitted,

PAUL TENG, Reg. No. 40,837
Attorney for Applicants
Cooper & Dunham LLP
1185 Avenue of the Americas
New York, N.Y. 10036
Tel.: (212) 278-0400